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Line Formulas

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List of 15 Line Formulas

Line 🗗

1) Number of Straight Lines using Non Collinear Points 🗗

fx $\boxed{N_{Lines} = C(N_{Non\ Collinear}, 2)}$

Open Calculator 🗗

ex $\boxed{36 = C(9, 2)}$

2) Shortest Distance of Arbitrary Point from Line 🗗

fx

Open Calculator 🗗

$$\boxed{d = modulus\left(\frac{(L_x \cdot x_a) + (L_y \cdot y_a) + c_{Line}}{\sqrt{(L_x^2) + (L_y^2)}}\right)}$$

ex $\boxed{9.838699 = modulus\left(\frac{(6 \cdot 5) + (\text{-}3 \cdot \text{-}2) + 30}{\sqrt{\left((6)^2\right) + \left((\text{-}3)^2\right)}}\right)}$

3) Shortest Distance of Line from Origin 📤

$$fx \quad d_{\text{Origin}} = \text{modulus}\left(\frac{c_{\text{Line}}}{\sqrt{\left(L_x^2\right) + \left(L_y^2\right)}} \right)$$

$$ex \quad 4.472136 = \text{modulus}\left(\frac{30}{\sqrt{\left((6)^2\right) + \left((-3)^2\right)}} \right)$$

4) X Coefficient of Line given Slope 📤

$$fx \quad L_x = -(L_y \cdot m)$$

$$ex \quad 6 = -(-3 \cdot 2)$$

Pair of Lines 📤

5) Acute Angle between Pair of Lines 📤

$$fx \quad \angle_{\text{Acute}} = \arctan\left(\left| \frac{m_2 - (m_1)}{1 + (m_1) \cdot m_2} \right| \right)$$

$$ex \quad 22.61986° = \arctan\left(\left| \frac{-0.2 - (0.2)}{1 + (0.2) \cdot -0.2} \right| \right)$$

6) Obtuse Angle between Pair of Lines 🔗

Open Calculator 🔗

$$fx \quad \angle_{\text{Obtuse}} = \pi - \arctan\left(\left|\frac{m_2 - (m_1)}{1 + (m_1) \cdot m_2}\right|\right)$$

$$ex \quad 157.3801° = \pi - \arctan\left(\left|\frac{-0.2 - (0.2)}{1 + (0.2) \cdot -0.2}\right|\right)$$

7) Shortest Distance between Parallel Lines 🔗

Open Calculator 🔗

$$fx \quad d_{\text{Parallel Lines}} = \text{modulus}\frac{c_1 - (c_2)}{\sqrt{(L_x^2) + (L_y^2)}}$$

$$ex \quad 14.90712 = \text{modulus}\frac{-50 - (50)}{\sqrt{((6)^2) + ((-3)^2)}}$$

Slope 🔗

Slope of Line 🔗

8) Slope of Line 🔗

Open Calculator 🔗

$$fx \quad m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$ex \quad 2 = \frac{-25 - 45}{-20 - 15}$$

9) Slope of Line given Angle with X-Axis ⎘

Open Calculator ⎘

fx $m = \tan(\angle_{\text{Inclination}})$

ex $2.144507 = \tan(65°)$

10) Slope of Line given Numerical Coefficients ⎘

Open Calculator ⎘

fx $m = -\dfrac{L_x}{L_y}$

ex $2 = -\dfrac{6}{-3}$

11) Slope of Line given Slope of Perpendicular ⎘

Open Calculator ⎘

fx $m = -\dfrac{1}{m_\perp}$

ex $2 = -\dfrac{1}{-0.5}$

Slope of Perpendicular of Line ⎘

12) Slope of Perpendicular of Line ⎘

Open Calculator ⎘

fx $m_\perp = -\dfrac{1}{m}$

ex $-0.5 = -\dfrac{1}{2}$

13) Slope of Perpendicular of Line given Angle of Line with X-Axis ⬀

Open Calculator ⬀

$$fx \quad m_\perp = -\frac{1}{\tan(\angle_{\text{Inclination}})}$$

$$ex \quad -0.466308 = -\frac{1}{\tan(65°)}$$

14) Slope of Perpendicular of Line given Numerical Coefficients of Line ⬀

Open Calculator ⬀

$$fx \quad m_\perp = \frac{L_y}{L_x}$$

$$ex \quad -0.5 = \frac{-3}{6}$$

15) Slope of Perpendicular of Line given Two Points on Line ⬀

Open Calculator ⬀

$$fx \quad m_\perp = -\frac{x_2 - x_1}{y_2 - y_1}$$

$$ex \quad -0.5 = -\frac{-20 - 15}{-25 - 45}$$

Variables Used

- $\angle_{Acute}$ Acute Angle between Pair of Lines *(Degree)*
- $\angle_{Inclination}$ Angle of Inclination of Line *(Degree)*
- $\angle_{Obtuse}$ Obtuse Angle between Pair of Lines *(Degree)*
- c_1 Constant Term of First Line
- c_2 Constant Term of Second Line
- c_{Line} Constant Term of Line
- d Shortest Distance of a Point from Line
- d_{Origin} Shortest Distance of Line from Origin
- $d_{Parallel\ Lines}$ Shortest Distance of Parallel Lines
- L_x X Coefficient of Line
- L_y Y Coefficient of Line
- m Slope of Line
- $m_{\perp}$ Slope of Perpendicular of a Line
- m_1 Slope of First Line
- m_2 Slope of Second Line
- N_{Lines} Number of Straight Lines
- $N_{Non\ Collinear}$ Number of Non Collinear Points
- x_1 X Coordinate of First Point in Line
- x_2 X Coordinate of Second Point in Line
- x_a X Coordinate of Arbitrary Point
- y_1 Y Coordinate of First Point in Line

- y_2 Y Coordinate of Second Point in Line
- y_a Y Coordinate of Arbitrary Point

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant

- Function: **abs**, abs(Number)
  Absolut value function

- Function: **arctan**, arctan(Number)
  Inverse trigonometric tangent function

- Function: **C**, C(n,k)
  Binomial coefficient function

- Function: **ctan**, ctan(Angle)
  Trigonometric cotangent function

- Function: **modulus**, modulus
  Modulus of number

- Function: **sqrt**, sqrt(Number)
  Square root function

- Function: **tan**, tan(Angle)
  Trigonometric tangent function

- Measurement: **Angle** in Degree (°)
  Angle Unit Conversion

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